

REMARKS

Claim Rejections 35 U.S.C. § 103 (a)

Claims 1, 4-12, 18, 20, 25, and 27-31

The Examiner has rejected claims 1, 4-12, 18, 20, 25, and 27-31 under 35 U.S.C. §103 (a) as being unpatentable over Casey, Jr. et al. (US 6,042,738) as demonstrated by Baum, Aaron Wolf et al. (US 5,684,360 A) in view of Hashimoto (US 6,420,701 B1).

Applicants respectfully disagree with the Examiner. Applicants have amended claims 1, 10, 12, 25, 27, 28, and 31. Support is provided at lines 23-28 on page 13 and lines 1-8 on page 14 of the specification.

Claim 1, as amended, of Applicants' claimed invention, claims an apparatus (400) including: a holder (420) to mount a substrate (410); a stage (430) to position the holder in a chamber (470); an imaging system (440) to locate an opaque defect (405) on the substrate, the imaging system located vertically above the substrate, the imaging system including a first electron column, the first electron column to direct a first set of electrons towards the opaque defect; a gas delivery system (450) to dispense a reactant gas towards the opaque defect; and an electron scanning delivery system (460) to induce chemical etching of the opaque defect by the reactant gas without damaging underlying layers, the electron scanning delivery system including a second electron column, the second electron column to direct a second set of electrons towards the opaque defect. See Figure 4. Also, see pages 12-14 of the specification.

Claim 10, as amended, of Applicants' claimed invention claims the apparatus of claim 1 further including a computer to control dwell time and scan rate of the electron scanning delivery system.

Claim 12, as amended, of Applicants' claimed invention, claims the apparatus of claim 1 further including a computer to control refresh time and retrace time of the electron scanning delivery system.

Claim 25, as amended, of Applicants' claimed invention, claims an apparatus (400) including: a chamber (470); a stage (430) located in the chamber, the stage to move in different directions; a holder (420) positioned in the chamber by the stage; a mask (410) mounted on the holder; an opaque defect (405) located on the mask; an imaging system (440) for the chamber, the imaging system located directly above the opaque defect, the imaging system to locate the opaque defect; a gas delivery system (450) for the chamber; a gas dispensed by the gas delivery system towards the opaque defect; an electron scanning delivery system (460) for the chamber; electrons directed by the electron scanning delivery system towards the opaque defect, the electrons to induce the gas to etch the opaque defect without damaging underlying layers; and a pumping system to evacuate volatile byproducts of the etch. See Figure 4. Also, see pages 12-14 of the specification.

Claim 27, as amended, of Applicants' claimed invention claims the apparatus of claim 25 wherein the electron scanning delivery system further comprises focusing controls.

Claim 28, as amended, of Applicants' claimed invention claims the apparatus of claim 25 wherein the electron scanning delivery system further includes focusing and scanning controls that are more sophisticated than in an SEM.

Claim 31, as amended, of Applicants' claimed invention, claims an apparatus (400) including: a chamber (470), the chamber to hold a mask (410); an imaging system (440) for the chamber, the imaging system located directly over the mask, the imaging system to locate an opaque defect (405) on the mask; a gas delivery system (450) for the chamber, the gas delivery system to dispense one or more gases towards the opaque defect; and an electron scanning delivery system (460) for the chamber, the electron scanning delivery system to direct electrons towards the opaque defect, the electrons to induce chemical etching of the opaque defect by the one or more gases without damaging underlying layers. See Figure 1. Also, see Col. 4, lines 28-34.

None of the three references cited by the Examiner teaches an electron scanning delivery system. Consequently, Applicants' claimed invention, as claimed

in claims 1, 25, or 31, would not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

Claims 4-12, 18, and 20 are dependent on claim 1. Claims 27-30 are dependent on claim 25. Since a combination of the apparatus of Casey, Jr. et al. and Hashimoto, even if possible, would still not produce the apparatus as claimed in claim 1, or claim 25, of Applicants' claimed invention, the apparatus claimed in claims 4-12, 18, 20, and 27-30 of Applicants' claimed invention would also not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw the rejections to claims 1, 4-12, 18, 20, 25, and 27-31 under 35 U.S.C. §103 (a).

Claim 19

The Examiner has rejected claim 19 under 35 U.S.C. §103 (a) as being unpatentable over Casey, Jr. et al. (US 6,042,738) as demonstrated by Baum, Aaron Wolf et al. (US 5,684,360 A) in view of Hashimoto, Horoyuki (US 6,420,701 B1) and Fuji, Eiji et al. (US 5,876,504 A).

Applicants respectfully disagree with the Examiner. Claim 19 is dependent on claim 1. Applicants have amended claim 1.

Claim 1, as amended, of Applicants' claimed invention, claims an apparatus (400) including: a holder (420) to mount a substrate (410); a stage (430) to position the holder in a chamber (470); an imaging system (440) to locate an opaque defect (405) on the substrate, the imaging system located vertically above the substrate, the imaging system including a first electron column, the first electron column to direct a first set of electrons towards the opaque defect; a gas delivery system (450) to dispense a reactant gas towards the opaque defect; and an electron scanning delivery system (460) to induce chemical etching of the opaque defect by the reactant gas without damaging underlying layers, the electron scanning delivery system

including a second electron column, the second electron column to direct a second set of electrons towards the opaque defect. See Figure 4. Also, see pages 12-14 of the specification.

None of the four references cited by the Examiner teaches an electron scanning delivery system. Consequently, Applicants' claimed invention, as claimed in claim 1, would not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

Claim 19 is dependent on claim 1. Since a combination of the apparatus of Casey, Jr. et al., Wolf, Hashimoto, and Fuji, even if possible, would still not produce the apparatus as claimed in claim 1, as amended, of Applicants' claimed invention, the apparatus claimed in claim 19 of Applicants' claimed invention would also not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw the rejections to claim 19 under 35 U.S.C. §103 (a).

Claims 21-24, 26, 32, and 33

The Examiner has rejected claims 21-24, 26, 32, and 33 under 35 U.S.C. §103 (a) as being unpatentable over Casey, Jr. et al. (US 6,042,738) as demonstrated by Baum, Aaron Wolf et al. (US 5,684,360 A) in view of Hashimoto, Hiroyuki (US 6,420,701 B1).

Applicants respectfully disagree with the Examiner. Claims 21-24 are dependent on claim 1. Claim 26 is dependent on claim 25. Claims 32-33 are dependent on claim 31. Applicants have amended claims 1, 25, and 31.

Claim 1, as amended, of Applicants' claimed invention, claims an apparatus (400) including: a holder (420) to mount a substrate (410); a stage (430) to position the holder in a chamber (470); an imaging system (440) to locate an opaque defect (405) on the substrate, the imaging system located vertically above the substrate, the imaging system including a first electron column, the first electron column to direct

a first set of electrons towards the opaque defect; a gas delivery system (450) to dispense a reactant gas towards the opaque defect; and an electron scanning delivery system (460) to induce chemical etching of the opaque defect by the reactant gas without damaging underlying layers, the electron scanning delivery system including a second electron column, the second electron column to direct a second set of electrons towards the opaque defect. See Figure 4. Also, see pages 12-14 of the specification.

Claim 25, as amended, of Applicants' claimed invention, claims an apparatus (400) including: a chamber (470); a stage (430) located in the chamber, the stage to move in different directions; a holder (420) positioned in the chamber by the stage; a mask (410) mounted on the holder; an opaque defect (405) located on the mask; an imaging system (440) for the chamber, the imaging system located directly above the opaque defect, the imaging system to locate the opaque defect; a gas delivery system (450) for the chamber; a gas dispensed by the gas delivery system towards the opaque defect; an electron scanning delivery system (460) for the chamber; electrons directed by the electron scanning delivery system towards the opaque defect, the electrons to induce the gas to etch the opaque defect without damaging underlying layers; and a pumping system to evacuate volatile byproducts of the etch. See Figure 4. Also, see pages 12-14 of the specification.

Claim 31, as amended, of Applicants' claimed invention, claims an apparatus (400) including: a chamber (470), the chamber to hold a mask (410); an imaging system (440) for the chamber, the imaging system located directly over the mask, the imaging system to locate an opaque defect (405) on the mask; a gas delivery system (450) for the chamber, the gas delivery system to dispense one or more gases towards the opaque defect; and an electron scanning delivery system (460) for the chamber, the electron scanning delivery system to direct electrons towards the opaque defect, the electrons to induce chemical etching of the opaque defect by the one or more gases without damaging underlying layers. See Figure 1. Also, see Col. 4, lines 28-34.

None of the three references cited by the Examiner teaches an electron scanning delivery system. Consequently, Applicants' claimed invention, as claimed in claim 1, claim 25, or claim 31, would not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

Claims 21-24 are dependent on claim 1. Claim 26 is dependent on claim 25. Claims 32-33 are dependent on claim 31. Since a combination of the apparatus of Casey, Jr. et al., Baum et al., and Hashimoto, even if possible, would still not produce the apparatus as claimed in claim 1, or claim 25, or claim 31 of Applicants' claimed invention, the apparatus claimed in claims 21-24, 26, and 32-33 of Applicants' claimed invention would also not have been obvious to one of ordinary skill in the art of semiconductors at the time the invention was made.

In view of the foregoing, Applicants respectfully request the Examiner to withdraw the rejections to claims 21-24, 26, and 32-33 under 35 U.S.C. §103 (a).

Conclusion

Applicants believe that all claims pending are now in condition for allowance so such action is earnestly solicited at the earliest possible date.

Pursuant to 37 C.F.R. 1.136(a)(3), Applicant hereby requests and authorizes the U.S. Patent and Trademark Office to treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time.


Should there be any additional charge or fee, including a Request for Continued Examination, an extension of time fee, or other fees under 37 C.F.R. 1.16 and 1.17, please charge Deposit Account No. 02-2666.

If a telephone interview would in any way expedite the prosecution of this application, the Examiner is invited to contact the undersigned at (408) 720-8300.

Respectfully submitted,

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